**I claim:**

1. A method for identifying an ideal plasma region of interest in a series of medical images, the method comprising:

(a) receiving image data representing the series of medical images into a computing device;

(b) receiving an identification of a plasma region;

(c) automatically assigning a score to each voxel in the image data in accordance with suitability for inclusion in the ideal plasma region of interest; and

(d) identifying the ideal plasma region of interest as including a plurality of voxels whose scores as assigned in step (c) are highest.

2. The method of claim 1, wherein step (c) comprises, for each voxel:

(i) determining a time point of maximum uptake, a slope at maximum uptake, a peak value and conformance to a gamma variate curve; and

(ii) assigning the score in accordance with step (c)(i).

3. The method of claim 1, wherein step (b) comprises receiving a manual identification of the plasma region from a user into the computing device.

4. The method of claim 1, wherein the identification of the plasma region is determined from a time of contrast injection in the medical images and a start of scanning of the medical images.

5. A device for identifying an ideal plasma region of interest in a series of medical images, the device comprising:

an input for receiving image data representing the series of medical images;

a region identifying device for providing an identification of regions in the image data; and

a computing device, in communication with the input and the region identifying device, for receiving an identification of a plasma region from the region identifying device, automatically assigning a score to each voxel in the image data in accordance with suitability for inclusion in the ideal plasma region of interest, and identifying the ideal plasma region of interest as including a plurality of voxels whose scores are highest.

6. The device of claim 5, wherein, for each voxel, the computing device determines a time point of maximum uptake, a slope at maximum uptake, a peak value and conformance to a gamma variate curve, and assigns the score in accordance with the time point of maximum uptake, the slope at maximum uptake, the peak value and the conformance to the gamma variate curve.

7. The device of claim 5, wherein the region identifying device comprises a pointing device for allowing a user to identify the regions in the series of medical images.

8. The device of claim 5, wherein the region identifying device determines the identification of the plasma region from a time of contrast injection in the medical images and a start of scanning of the medical images.

9. A method for estimating a volume transfer constant between blood plasma and extra-vascular extra-cellular space in a series of medical images, the method comprising:

(a) receiving image data representing the series of medial images into a computing device;

(b) identifying tumor margins in the image data;

(c) automatically identifying an optimized plasma signal in the image data such that the optimized plasma signal is optimized to eliminate flow artifacts;

(d) determining uptake curves from the image data in accordance with both the tumor margins and the optimized plasma signal; and

(e) estimating the volume transfer constant from the uptake curves determined in step (d).

10. The method of claim 9, wherein step (c) comprises:

(i) receiving an identification of a plasma region;

(ii) automatically assigning a score to each voxel in the image data in accordance with suitability for inclusion in the ideal plasma region of interest; and

(iii) identifying the ideal plasma region of interest as including a plurality of voxels whose scores as assigned in step (c)(ii) are highest.

11. The method of claim 10, wherein step (c)(i) comprises receiving a manual identification of the plasma region from a user into the computing device.

12. The method of claim 10, wherein step (c)(i) comprises determining the identification of the plasma region from a time of contrast injection in the medical images and a start of scanning of the medical images.

13. The method of claim 10, wherein step (c)(ii) comprises, for each voxel:

(A) determining a time point of maximum uptake, a slope at maximum uptake, a peak value and conformance to a gamma variate curve; and

(B) assigning the score in accordance with step (c)(ii)(A).

14. The method of claim 10, wherein step (b) is performed through geometrically constrained region growth.

15. The method of claim 10, wherein step (e) comprises estimating the volume transfer constant through gradient-descent energy minimization.

16. The method of claim 10, wherein the gradient-descent energy minimization is performed a plurality of times to avoid local minima.

17. The method of claim 9, further comprising (f) forming an image representing the volume transfer constant.

18. The method of claim 9, wherein at least one of step (b) and step (c) comprises correcting for inter-frame motion.

19. A device for estimating a volume transfer constant between blood plasma and extra-vascular extra-cellular space in a series of medical images, the device comprising:

an input for receiving image data representing the series of medical images;

a pointing device for allowing a user to identify regions in the series of medical images; and

a computing device, in communication with the input and the pointing device, for identifying tumor margins in the image data, automatically identifying an optimized plasma signal in the image data such that the optimized plasma signal is optimized to eliminate flow artifacts, determining uptake curves from the image data in accordance with both the tumor margins and the optimized plasma signal, and estimating the volume transfer constant from the uptake curves.

20. The device of claim 19, wherein the computing device identifies the optimized plasma signal by receiving an identification of a plasma region, automatically assigning a score to each voxel in the image data in accordance with suitability for inclusion in the ideal plasma region of interest, and identifying the ideal plasma region of interest as including a plurality of voxels whose scores are highest.

21. The device of claim 20, wherein the computing device receives a manual identification of the plasma region from a user into the computing device.

22. The device of claim 20, wherein the computing device determines the identification of the plasma region from a time of contrast injection in the medical images and a start of scanning of the medical images.

23. The device of claim 20, wherein the computing device assigns the score to each voxel by determining a time point of maximum uptake, a slope at maximum uptake, a peak

value and conformance to a gamma variate curve, and assigning the score in accordance with the time point of maximum uptake, the slope at maximum uptake, the peak value and the conformance to teh gamma variate curve.

24. The device of claim 20, wherein the computing device identifies the tumor margins through geometrically constrained region growth.

25. The device of claim 20, wherein the computing device estimates the volume transfer constant from the uptake curves by estimating the volume transfer constant through gradient-descent energy minimization.

26. The device of claim 25, wherein the gradient-descent energy minimization is performed a plurality of times to avoid local minima.

27. The device of claim 19, wherein the computing device further forms an image representing the volume transfer constant.

28. The device of claim 19, wherein the computing device corrects at least one of the tumor margins and the plasma signal for inter-frame motion.